Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221

23 JUL 2003

ENTERED

JUL 2003

Mr. Steve Zappe, WIPP Project Leader
Hazardous Waste Permits Program
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
2905 E. Rodeo Park Drive, Bldg. 1
Santa Fe, NM 87505

Subject: Transmittal of Approved Waste Stream Profile Form MU-W002 by the Central Characterization Project at Argonne National Laboratory - East

Dear Mr. Zappe:

The Department of Energy, Carlsbad Field Office (CBFO) has approved the Waste Stream Profile Form MU-W002 by the Central Characterization Project at Argonne National Laboratory - East. Enclosed is a copy of the approved form as required by Section B-4(b)(1) of the WIPP Hazardous Waste Facility Permit No. NM4890139088-TSDF.

If you have any questions on this matter, please contact me at (505) 234-7357 or (505) 706-0066.

Sincerely,

Kerry W. Watson
CBFO Assistant Manager
Office of National TRU Program

Enclosure

cc: w/o enclosure
J. Kieling, NMED
C. Walker, TechLaw
J. Bennett, WTS
P. Roush, WTS
L. Greene, WRES
S. Calvert, CTAC
CBFO M&RC

CBFO:NTP:KWW:IW:03-2602:UFC:5822

030755

CCP Waste Stream Profile Form

(1) Waste Stream Profile Number: MU-W002	
(2) Generator site name: ANL-E	(3)Technical contact: Steven Rose
(3) Generator site EPA ID: IL3890008946	(3) Technical contact phone number: 505-234-7591
(4) Date of audit report approval by NMED: May 8, 2003	
(4) Title, version number, and date of documents used for WAP Certification: CCP-PO-001, rev. 6, CCP Transuranic Waste Characterization Quality Assurance Project Plan, June 11, 2003 CCP-PO-002, rev. 6, CCP Transuranic Waste Certification Plan, June 11, 2003 CCP-PO-007, rev. 6, CCP/ANL-E Interface Document, January 26, 2003 CCP-AK-MURR-001, rev. 1, CCP Acceptable Knowledge Summary Report for Missouri University Research Reactor TRUMP-S Project, July 15, 2003	
Did your facility generate this waste? Yes ☐ No ☒	(5) If no, provide the name and EPA ID of the original generator: University of MO-Columbia, MOD006326904
Waste Stream Information[1]	
(6) WIPP ID: MU-W002	(7) Summary Category Group: S5000
(8) Waste Matrix Code Group: Heterogeneous Debris Waste	(9) Waste Stream Name: MURR Heterogeneous Debris from TRUMP-S Project
(10) Description from the TWBIR: The following description is from CCP-AK-MURR-001, rev. 0, instead of the TWBIR: The MURR mixed TRU waste stream is heterogeneous debris consisting primarily of lab waste including glove box gloves, polyethylene vials, glass laboratory apparatus, paper towels, tools, polyethylene bags, rubber gloves, o-rings, wires, and crucibles, all of which were exposed to metallic actinides, salts containing actinides, or aqueous solutions containing actinides.	
(11) Defense TRU Waste: Yes ☒ No ☐	(11) Check One: CH ☒ RH ☐
(11) Number of SWBs 0	(11) Number of Drums 7	(11) Number of Canisters 0
(12) Batch Data report numbers supporting this waste stream characterization: See form CCP-TP-002-A4	
(13) List applicable EPA Hazardous Waste Codes:[2] D006, D011	
(14) Applicable TRUCON Content Codes: SQ221	
Acceptable Knowledge Information[1]	
[For the following, enter supporting the documentation used (i.e., references and dates)]	
Required Program Information	
(15) Map of site: CCP-AK-MURR-001, rev. 1, July 15, 2003, Section 4.1.1, Figure 1a and Figure 1b	
(15) Facility mission description: CCP-AK-MURR-001, rev. 1, July 15, 2003, Section 4.1.4	
(15) Description of operations that generate waste: CCP-AK-MURR-001, rev. 1, July 15, 2003, Sections 4.1.2, 4.1.3, and 4.3	
(15) Waste identification/categorization schemes: CCP-AK-MURR-001, rev. 1, July 15, 2003, Section 4.4	
(15) Types and quantities of waste generated: CCP-AK-MURR-001, rev. 1, July 15, 2003, Section 4.2.1	
(15) Correlation of waste streams generated from the same building and process, as appropriate: CCP-AK-MURR-001, rev. 1, July 15, 2003, Section 4.2.2	
(15) Waste certification procedures: CCP-TP-001, rev. 9, CCP Project Level Data Validation and Verification, July 10, 2003 CCP-TP-002, rev. 13, CCP Reconciliation of DQOs and Reporting Characterization Data, June 27, 2003 CCP-TP-003, rev. 13, CCP Sampling Design and Data Analysis for RCRA Characterization, June 28, 2003 CCP-TP-005, rev. 12, CCP Acceptable Knowledge Documentation, March 26, 2003 CCP-TP-030, rev. 8, CCP WWIS Data Entry and TRU Waste Certification, March 26, 2003	

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Required Waste Stream Information		
(16) Area(s) and building(s) from which the waste stream was generated: CCP-AK-MURR-001, rev. 1, July 15, 2003, Section 5.1		
(16) Waste stream volume and time period of generation: CCP-AK-MURR-001, rev. 1, July 15, 2003, Section 5.2		
(16) Waste generating process description for each building: CCP-AK-MURR-001, rev. 1, July 15, 2003, Sections 5.3 and 4.3		
(16) Process flow diagrams: CCP-AK-MURR-001, rev. 1, July 15, 2003, Section 4.3 Figures 2 and 3		
(16) Material inputs or other information identifying chemical/radionuclide content and physical waste form: CCP-AK-MURR-001, rev. 1, July 15, 2003, Sections 5.4.1 through 5.4.7		
(16) Which Defense Activity generated the waste: (check one)		
☐ Weapons activities including defense inertial confinement fusion	☐ Naval Rectors development	
☐ Verification and control technology	☐ Defense research and development	
☒ Defense nuclear waste and material by products management	☐ Defense nuclear material production	
☐ Defense nuclear waste and materials security and safeguards and security investigations		
Supplemental Documentation		
(17) Process design documents: None Compiled		
(17) Standard operating procedures: P002, P003		
(17) Safety Analysis Reports: None Compiled		
(17) Waste packaging logs: M001		
(17) Test plans/research project reports: M004		
(17) Site databases: None Compiled		
(17) Information from site personnel: C001, C005, C006		
(17) Standard industry documents: P007		
(17) Previous analytical data: M001, M002		
(17) Material safety data sheets: None Compiled		
(17) Sampling and analysis data from comparable/surrogate Waste: None Compiled		
(17) Laboratory notebooks: None Compiled		
Sampling and Analysis Information[2]		
For the following, when applicable, enter procedure title(s), number(s) and date(s)		
	(18) Radiography: CCP-TP-045, rev. 6, CCP RTR #5 Radiography Inspection Operating Procedure, January 31, 2003	
	(18) Visual Examination: CCP-TP-013, rev. 13, CCP Waste Visual Examination and Repackaging, May 30, 2003.	
	Headspace Gas Analysis	
	(19) VOCs: CCP-TP-031, rev. 12, CCP Headspace Gas Sampling Using Automated Manifold, February 4, 2003. CCP-TP-034, rev. 9, CCP HSG Data Generation and Batch Data Reporting, February 4, 2003.	
	(19) Flammable: CCP-TP-031, rev. 12, CCP Headspace Gas Sampling Using Automated Manifold, February 4, 2003. CCP-TP-034, rev. 9, CCP HSG Data Generation and Batch Data Reporting, February 4, 2003.	
	(19) Other gases (specify): CCP-TP-031, rev. 12, CCP Headspace Gas Sampling Using Automated Manifold, February 4, 2003. CCP-TP-034, rev. 9, CCP HSG Data Generation and Batch Data Reporting, February 4, 2003.	
	Homogeneous Solids/Soils/Gravel Sample Analysis	
	(20) Total metals: N/A	
	(20) PCBs: N/A	
	(20) VOCs: N/A	
	(20) Nonhalogenated VOCs: N/A	
	(20) Semi-VOCs: N/A	
	(20) Other (specify): N/A	

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CCP Waste Stream Profile Form

Comments:

Waste Stream Profile Form Certification:

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

(21) _____	Steven Rose	7-15-03
Signature of Site Project Manager	Printed Name	Date

NOTE: (1) Use back of sheet or continuation sheets, if required.
(2) If radiography, visual examination, headspace gas analysis, and/or homogeneous solids/soils/gravel sample analysis were used to determine EPA Hazardous Waste Codes, attach signed Characterization Information Summary documenting this determination.

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SUMMATION OF ASPECTS OF AK SUMMARY REPORT: MU-W002

Overview:

The waste described in this AK Summary Report was generated as a result of research conducted under a grant awarded to the University of Missouri-Columbia (MU). MU's research was a collaborative effort by the Chemical Engineering Department, Nuclear Engineering Program, Chemistry Department, and the Research Reactor Facility (MURR). The research experiments were conducted under the project name TRUMP-S (TRansUranic Management through Pyropartitioning Separation) which began in April 1991 and concluded in September 1997. The TRUMP-S project was a series of experiments designed to demonstrate the feasibility of a new process for separating long-lived actinides from PUREX process residue in support of defense material reprocessing. The TRUMP-S process could be used to treat existing and future PUREX wastes from defense reprocessing activities. The MURR TRUMP-S experiments did not use either actual PUREX waste or high-level waste. There are no plans at MURR to continue the research. The mixed TRU waste was derived from the defense related category: defense nuclear waste and materials by-products management. Defense Waste generated from these activities is consistent with guidance from the Carlsbad Field Office for waste disposal at the WIPP.

The MURR mixed TRU waste stream is heterogeneous debris consisting primarily of lab waste including glove box gloves, polyethylene vials, glass laboratory apparatus, paper towels, tools, polyethylene bags, rubber gloves, o-rings, wires, and crucibles, all of which were exposed to metallic actinides, salts containing actinides, or aqueous solutions containing actinides. This summation of the AK Summary Report includes information to support Waste Stream Profile Form (WSPF) Number MU-W002 for Heterogeneous Debris Waste. Additional details are discussed in CCP-AK-MURR-001, *Central Characterization Project Acceptable Knowledge Summary Report for Missouri University Research Reactor TRUMP-S Project.*

Waste Stream Identification Summary:

Site Where TRU Waste Was Generated:	University of Missouri-Columbia Research Reactor Center 1513 South Providence Rd on Research Park Drive off of MO State HWY 163 Columbia, MO 65201
Waste Stream Name:	MURR Heterogeneous Debris from TRUMP-S Project
Waste Stream Number:	MU-W002
Dates of Waste Generation:	1991 - 1997
Facility Where TRU Waste Was Generated:	Alpha Laboratory, MURR
Waste Stream Volume:	7 drums
Summary Category Group:	S5000 – Debris Waste
Waste Stream TWBIR Identification:	MU-W002
Waste Stream MWIR Identification:	None Available
Waste Matrix Code Group:	Heterogeneous Debris Waste
RCRA Hazardous Waste Codes:	D006, D011
Waste Matrix Code:	S5400 – Heterogeneous Debris

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SUMMATION OF ASPECTS OF AK SUMMARY REPORT: MU-W002

Overview:

The waste described in this AK Summary Report was generated as a result of research conducted under a grant awarded to the University of Missouri-Columbia (MU). MU's research was a collaborative effort by the Chemical Engineering Department, Nuclear Engineering Program, Chemistry Department, and the Research Reactor Facility (MURR). The research experiments were conducted under the project name TRUMP-S (TRansUranic Management through Pyropartitioning Separation) which began in April 1991 and concluded in September 1997. The TRUMP-S project was a series of experiments designed to demonstrate the feasibility of a new process for separating long-lived actinides from PUREX process residue in support of defense material reprocessing. The TRUMP-S process could be used to treat existing and future PUREX wastes from defense reprocessing activities. The MURR TRUMP-S experiments did not use either actual PUREX waste or high-level waste. There are no plans at MURR to continue the research. The mixed TRU waste was derived from the defense related category: defense nuclear waste and materials by-products management. Defense Waste generated from these activities is consistent with guidance from the Carlsbad Field Office for waste disposal at the WIPP.

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Site Where TRU Waste Was Generated:	University of Missouri-Columbia Research Reactor Center 1513 South Providence Rd on Research Park Drive off of MO State HWY 163 Columbia, MO 65201
Waste Stream Name:	MURR Heterogeneous Debris from TRUMP-S Project
Waste Stream Number:	MU-W002
Dates of Waste Generation:	1991 - 1997
Facility Where TRU Waste Was Generated:	Alpha Laboratory, MURR
Waste Stream Volume:	7 drums
Summary Category Group:	S5000 – Debris Waste
Waste Stream TWBIR Identification:	MU-W002
Waste Stream MWIR Identification:	None Available
Waste Matrix Code Group:	Heterogeneous Debris Waste
RCRA Hazardous Waste Codes:	D006, D011
Waste Matrix Code:	S5400 – Heterogeneous Debris

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This waste stream is assigned the waste matrix code (WMC) S5400 "Heterogeneous Debris" because the waste is not pre-dominantly organic or inorganic waste as defined by the DOE Waste Treatability Group Guidance document.

TRUPACT-II Content Code (TRUCON): SQ221

Waste Stream Description:

The MURR mixed TRU waste stream is heterogeneous debris consisting primarily of lab waste including glove box gloves, polyethylene vials, glass laboratory apparatus, paper towels, tools, polyethylene bags, rubber gloves, o-rings, wires, and crucibles, all of which were exposed to metallic actinides, salts containing actinides, or aqueous solutions containing actinides. The waste was double or triple bagged with twist and tape seals, although only one layer of confinement remains. Each bag and its contents were identified with a label. Cadmium (D006) and silver (D011) are the RCRA hazardous constituents in the waste stream. Additional detail is provided in Section 5.0, CCP-AK-MURR-001.

The waste was generated between 1991 and 1997.

Point of Generation

Location

The Missouri University Research Reactor is located on the campus of the University of Missouri - Columbia in Columbia, MO.

Area and Building of Generation

The waste was generated in the Alpha Lab at the Missouri University Research Reactor building.

Generating Processes

Description of Waste Generating Process

The TRUMP-S process is a pyrochemical process proposed to recover long-lived actinides from PUREX waste, through a series of processing steps, to a final electrolyte separation of actinides from rare earths in a molten salt electrolyte. The PUREX process is an established aqueous process that recovers 99.5% of the uranium and plutonium from spent nuclear fuel. Nitrate residues from PUREX waste are converted to oxides through microwave denitration. The oxides are chlorinated and then dissolved in molten chloride salts. A molten salt/liquid metal partitioning step separates rare earths and actinides from the more noble fission products and reactive metals. The resulting liquid metal solution of actinides and rare earths are transferred to an electrorefiner where actinides are separated from rare earth fission products by electrodeposition from molten LiCl/KCl eutectic onto a solid cathode, with the majority of rare metals remaining in the salt.

The MURR TRUMP-S experiments did not use either actual PUREX waste or high level waste. Actinide metal chlorides were prepared (using U, Np, Pu, Am) and combined with commercially available rare earth metals and metal chlorides to simulate PUREX waste. Samples of the molten salt and liquid metal phases from the individual experiments were dissolved in water or nitric acid and analyzed using an Inductively Coupled Plasma Mass Spectrometer. The waste solutions were rendered basic with sodium hydroxide pellets and evaporated to dryness, producing a dry powder with all metals in an oxidized state.

Lithium metal was the only non-radioactive pyrophoric used in the experiments. The waste lithium metal was oxidized in water, and the solutions were neutralized and evaporated to dryness. This solid was passed to a low-level waste stream and is not part of this MU-W002 waste stream. The plutonium and americium are contained in experimental residues in an oxidized state and are non-pyrophoric. No volatile organics are present in the waste stream. In general, liquid residues, including NaOH and nitric acid solutions, were pH adjusted and treated via either evaporation or solidification.

The TRUMP-S project was conducted in the Alpha Lab using 3 glove boxes. The first glove box (argon glove box) eliminated oxygen, water, nitrogen and hydrogen from the experimental working atmosphere. An argon atmosphere was required since the materials used in the experiments would react with oxygen, water, and nitrogen at elevated temperatures. All electrochemical measurements were made in the argon glove box.

The second glove box, an air glove box, was used to prepare aqueous samples for analysis and to solidify and/or package samples for storage or disposal. This glove box contained an analytical balance and a stirrer/hot plate for dissolution of the samples from the experiments in the argon glove box.

The third glove box was used as a sample preparation area and contained part of the Inductively Coupled Plasma-Mass Spectrometer which used an argon plasma to ionize the nebulized aqueous samples prepared for analysis.

The TRU waste at MURR was generated by laboratory and routine maintenance operations. In general, facility maintenance was conducted during lab reconfiguration or the decommissioning of a portion of a glove box system.

RCRA Determinations-Hazardous Waste Determinations

Ignitability

This waste stream does not contain liquid waste or other constituents that would demonstrate the RCRA characteristic of ignitability. Therefore, the ignitability characteristic (D001) does not apply to the waste.

Corrosivity

Under 40 CFR 261.22, a solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

- It is aqueous with a pH less than or equal to 2, or greater than or equal to 12.5, as determined by a pH meter using Method 9040 in "Test Methods for Evaluation Solid Waste, Physical and Chemical Methods," EPA Publication SW-846.
- It is a liquid and corrodes steel (SAE 1020) at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55 degrees Celsius (130 degrees Fahrenheit) as determined by its test method specified in National Association of Corrosion Engineer (NACE) Standard TM-01-69 as standardized in SW-846.

In general, liquid residues, including corrosives were pH adjusted and treated via either evaporation or solidification. The waste in this stream is not an aqueous liquid. As determined by radiography and visual examination, none of the drums to be shipped contained greater than 1 volume percent liquid (present as residual liquid). The corrosive characteristic (D002) does not apply to the waste.

Reactivity

The waste stream does not meet the characteristic of reactivity as defined under RCRA 40 CFR 261.23. The waste materials are stable and will not react violently with water, form potentially explosive mixtures with water or generate toxic gases, vapors or fumes when mixed with water or generate toxic gases, vapors or fumes when mixed with water based on information contained in the source documents.

The materials do not contain sulfides and are not capable of detonation or explosive reaction. Further, this waste does not present a compatibility hazard due to the chemicals identified with each other with the packaging of the waste. Therefore, the waste code for reactivity (D003) is not assigned to this waste stream.

Toxicity

Cadmium and silver were used in the TRUMP-S experimental program and may be present in all of the waste. There is approximately 1400 g of cadmium and 0.8g of silver in the waste.

Containers holding hazardous materials were required to be labeled appropriately. The hazardous waste codes D006 (cadmium) and D011 (silver) have been applied to the waste stream.

The glovebox gloves used in the TRUMP-S Project did not contain lead and no other potential sources of lead were identified; hence, D008 (lead) has not been applied to this waste stream. No other RCRA characteristic metals are indicated in the waste stream. Based on this information, this waste stream has the following hazardous waste number assignments: D006 (cadmium) and D011 (silver).

F-Listed and Other Solvents

Source documents do not indicate the presence of any F-Listed solvents. Based on this information, this waste stream has not been assigned any F-Listed codes.

Toxicity Characteristic Organic Solvents

Source documents do not indicate the presence of any toxicity characteristic organic solvents. Based on this information, this waste stream has not been assigned any toxicity characteristic organic solvent waste codes.

U-and P-Listed Chemicals

Source documents do not indicate the presence of any U-Listed Chemicals or P-Listed Chemicals. Based on this information, this waste stream has not been assigned any U- or P-listed codes.

Polychlorinated Biphenyls

Based on information contained in the source documents, this waste stream does not contain PCBs or PCB-containing articles. The absence of PCBs was confirmed by using RTR and/or VE to inspect every waste container for the presence of PCB suspect items.

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Physical Form

MU-W002 is a debris waste stream that contains metals, other inorganic materials, and organic materials (e.g., plastic, paper). The physical form of this waste stream has been confirmed using RTR and /or VE.

Prohibited Items

Source documents did not indicate that any prohibited items would be present in the waste. Any liquid waste remaining after an experiment or activity was evaporated or solidified prior to bagging-out of the glove box as waste. All wastes were solids at room temperature, and all of the waste was 'dry' when originally bagged-out of the glove box. The residual liquid that now exists in some of the bags is a result of condensation/accumulation. None of these residual liquids are in a vial or other internal container, and the amount is below the 1% container volume threshold.

No explosives were used in the experimental program. Sharp and heavy objects were packaged to provide puncture protection, and there are no sealed or pressurized containers in the waste.

All seven of the drums in this waste stream underwent RTR and one drum was selected for visual examination as a quality control check on the RTR process. These processes were used to determine that the containers do not include prohibited items, such as free liquids, sealed containers greater than four liters, or non-punctured aerosol cans. This information was documented during the RTR and/or VE process.

Headspace Gas/Volatile Organic Compound Information

Headspace gas sampling and analysis have been completed on all 7 drums in the waste stream MU-W002. No headspace gas target analytes or tentatively identified compounds were detected in the samples. The headspace gas sampling and analysis confirms the acceptable knowledge for this waste stream.

The specifics of this information are included in the attached Headspace Gas Summary report.

Radionuclide Information

Radiological Characterization

According to the AK Summary Report, the two most prevalent radionuclides, by mass, are U-238 and Np-237. The waste consists of the following radioisotopes and corresponding weight percent (wt %) distribution:

Am-241	18.62%
Np-237	27.43%
Pu-238	Not Expected
Pu-239	10.72%
Pu-240	0.63%
Pu-242	Not Expected
U-233	Not Expected
U-234	Not Expected
U-235	0.09%
U-238	42.51%
Sr-90	Not Expected
Cs-137	Not Expected

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Waste Stream Profile Form: MU-M002

Attachment 1 - Source Documents

SD Number	Title / Description
C001	Interview with John Ernst, Associate Director of the Regulatory Assurance Group at the Research Reactor. David B Becker 7/11/02
C002	Email regarding matrix depletion, decay heat limits, and TRUCON codes. Barbara Trujillo, LANL RRES-AT Certification Staff 7/29/02
C003	Email confirming a Nucfil-013 drum vent filter. Terry Wickland,VP products Nuclear Filter 8/12/02
C004	Interview with John Ernst regarding actinide inventory discrepancies. David B Becker 3/11/03
C005	Email with John Ernst regarding the selection of the MURR for the TRUMP-S project 3/28/03
C006	Correspondence with John Ernst -- various topics 4/8/03
D001	WIPP Eligibility Determination of TRUMP-S Wastes. DOE Oakland Operations Office / Carol L. Irvine 9/11/98
DR001	Discrepancy Resolution -- Total MURR Mixed TRU Actinide Inventory. David B Becker 3/12/03
M001	Visual Examination Record for Packaging MURR TRU Waste Repackaging videos. William D. Pickett, Andrea Shipp 12/29/98
M002	Waste Material Parameter worksheet. David B Becker 3/4/03
M003	University of Missouri-Columbia Interactive Campus Map University of Missouri – Office of Visitor Relations
M004	Separation of Actinides from Lanthanides Utilizing Molten Salt Electrorefining. D. L. Grimmett, S. P. Fusselman, J. J. Roy, R. L. Gay, C. L. Krueger, T. S. Storvik, T. Inouc, T. Hijikata, N. Takahashi 1996
M005	Excel spreadsheet – radiological properties. David B Becker 3/24/03
P001	MURR MTRU Waste Management Plan University of Missouri- Columbia MURR, DOE Oakland Operations Office October 1998
P002	MURR MTRU Waste Management Plan Appendix A -- TRUMP-S Standard Operating Procedures University of Missouri - Columbia / DOE Oakland Operations Office assigned to James R Schuh
P003	MURR MTRU Waste Management Plan Appendix B -- Hazardous Materials Management Procedure Manual University of Missouri-Columbia 1993
P004	MURR MTRU Waste Management Plan Appendix C -- Permit Modification for Container Storage of Mixed Waste for the University of Missouri-Columbia 1996
P005	MURR MTRU Waste Management Plan Appendix D -- TRUCON codes. DOE August 11, 1997
P006	MURR MTRU Waste Management Plan Appendix E -- Mixed Transuranic Waste Inventories. University of Missouri-Columbia 1998
P007	MURR MTRU Waste Management Plan Appendix F -- Purchase Documents for the 55-gallon Drums, Lids, and Filters for the MURR MTRU Waste Containers Nuclear Filter Technology, etc. 1997,1998

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CHARACTERIZATION INFORMATION SUMMARY

MU-W002, Lot 1

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CCP Characterization Information Summary Cover Page

WSP: # MU-W002 Lot #: 1

AK Expert Review: David B Backer Date: 7/15/03

STR Review (if necessary): _____ Date: _____

SPQAO Review: _____ Date: 7/15/03

SPM Review: _____ Date: 7-15-03

SPQAO signature indicates that the information presented in this package is consistent with analytical batch reports.

SPM signature certifies that through Acceptable Knowledge testing and/or analysis that the waste identified in this summary is not corrosive, ignitable, reactive, or incompatible with the TSDF.

A summary of the Acceptable Knowledge regarding this waste stream containing specific information about the corrosivity, reactivity, and ignitability of the waste stream is included as an attachment to the Waste Stream Profile Form. By reference, that information is included in this lot.

List of procedures used:
Visual Examination:
CCP-TP-013, rev. 13, CCP Waste Visual Examination and Repackaging, May 30, 2003.
CCP-TP-013, rev. 12, CCP Waste Visual Examination and Repackaging, January 26, 2003.
CCP-TP-013, rev. 11, CCP Waste Visual Examination and Repackaging, December 6, 2002.
CCP-TP-013, rev. 10, CCP Waste Visual Examination and Repackaging, November 26, 2002.
CCP-TP-013, rev. 9, CCP Waste Visual Examination and Repackaging, September 4, 2002.
CCP-TP-013, rev. 8, CCP Waste Visual Examination and Repackaging, August 26, 2002.
CCP-TP-013, rev. 7, CCP Waste Visual Examination and Repackaging, June 18, 2002.
CCP-TP-013, rev. 6, CCP Waste Visual Examination and Repackaging, June 14, 2002.
CCP-TP-013, rev. 5, CCP Waste Visual Examination and Repackaging, June 5, 2002.
CCP-TP-013, rev. 4, CCP Waste Visual Examination and Repackaging, April 17, 2002.
CCP-TP-013, rev. 3, CCP Waste Visual Examination and Repackaging, April 3, 2002.
CCP-TP-013, rev. 2, CCP Waste Visual Examination and Repackaging, March 5, 2002.
CCP-TP-013, rev. 1, CCP Waste Visual Examination and Repackaging, September 24, 2001.

Headspace Gas Analysis:
CCP-TP-031, rev. 12, CCP Headspace Gas Sampling Using Automated Manifold, February 4, 2003.

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CCP-TP-031, rev. 11, CCP Headspace Gas Sampling Using Automated Manifold, October 16, 2002.
CCP-TP-031, rev. 10, CCP Headspace Gas Sampling Using Automated Manifold, September 3, 2002.
CCP-TP-031, rev. 9, CCP Headspace Gas Sampling Using Automated Manifold, July 18, 2002.
CCP-TP-031, rev. 8, CCP Headspace Gas Sampling Using Automated Manifold, April 30, 2002.
CCP-TP-031, rev. 7, CCP Headspace Gas Sampling Using Automated Manifold, March 28, 2002.
CCP-TP-031, rev. 6, CCP Headspace Gas Sampling Using Automated Manifold, March 25, 2002.
CCP-TP-031, rev. 5, CCP Headspace Gas Sampling Using Automated Manifold, March 8, 2002.
CCP-TP-031, rev. 4, CCP Headspace Gas Sampling Using Automated Manifold, January 24, 2002.
CCP-TP-031, rev. 3, CCP Headspace Gas Sampling Using Automated Manifold, November 13, 2001.
CCP-TP-031, rev. 2, CCP Headspace Gas Sampling Using Automated Manifold, September 27, 2001.
CCP-TP-031, rev. 1, CCP Headspace Gas Sampling Using Automated Manifold, August 28, 2001.
CCP-TP-034, rev. 10, CCP HSG Data Generation and Batch Data Reporting, June 2, 2003.
CCP-TP-034, rev. 9, CCP HSG Data Generation and Batch Data Reporting, February 4, 2003.
CCP-TP-034, rev. 8, CCP HSG Data Generation and Batch Data Reporting, October 16, 2002,
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CCP-TP-017, rev. 14, CCP APNEA Data Analysis, January 23, 2003
CCP-TP-017, rev. 13,CCP APNEA Data Analysis, August 29, 2002
CCP-TP-017, rev. 12,CCP APNEA Data Analysis, August 6, 2002
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CCP-TP-018, rev. 7,CCP APNEA Waste Drum Assay Operations, May 21, 2002

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CCP-TP-036, rev. 12, CCP WIT Nondestructive Assay, August 30, 2002
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CCP-TP-038, rev. 4, CCP WIT Nondestructive Assay Empirical Data Quality Measurements, August 26, 2002
CCP-TP-038, rev. 3, CCP WIT Nondestructive Assay Empirical Data Quality Measurements, June 6, 2002

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CCP-PO-001, rev. 4, CCP Transuranic Waste Characterization Quality Assurance Project Plan, May 31, 2002
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CCP-PO-002, rev. 5, CCP Transuranic Waste Certification Plan, February 12, 2003
CCP-PO-002, rev. 4, CCP Transuranic Waste Certification Plan, May 17, 2002
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CCP-PO-007, rev. 0, CCP/ANL-E Interface Document, August 22, 2001

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CCP Correlation of Container Identification Numbers to Batch Data Report Numbers

WSP: # **MU-W002** **Lot #:** **1**

Container ID Number	On-Line Headspace Gas BDR	NDA BDR	RTR BDR	VE BDR	Solids Sampling BDR	Solids Analytical BDR	Load Management/ Overpack Yes
SQS121C1	AEHSG01052003a	AEAPNEA052803a	SQRTR0001	AEMover060103A	N/A	N/A	
SQS121C2	AEHSG01052003a	AEAPNEA052803a	SQRTR0001	N/A	N/A	N/A	
SQS121C3	AEHSG01052003a	AEAPNEA052803a	SQRTR0001	N/A	N/A	N/A	YES
SQS121C4	AEHSG01052003a	AEAPNEA052803a	SQRTR0001	N/A	N/A	N/A	
SQS121C5	AEHSG01052003a	AEAPNEA052803a	SQRTR0001	N/A	N/A	N/A	
SQS121C6	AEHSG01052003a	AEAPNEA052903a	SQRTR0001	N/A	N/A	N/A	YES
SQS121C7	AEHSG01052003a	AEAPNEA052903a	SQRTR0001	N/A	N/A	N/A	

Signature of Site Project Manager

Steven Rose
Printed Name

7-15-03
Date

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CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: MU-W002 **Waste Stream Lot Number:** 1

ANALYTE	Transform Data Used (No, Data-Log, SQTI, other)	# Samples	# Samples above MDL	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
Benzene	No	7	0	0.70	0.70	0		10	N/A		
Bromoform	No	7	0	0.50	0.50	0		10	N/A		
Carbon tetrachloride	No	7	0	0.70	0.70	0		10	N/A		
Chlorobenzene	No	7	0	0.90	0.90	0		10	N/A		
Chloroform	No	7	0	0.60	0.60	0		10	N/A		
Cyclohexane[a]	N/A	0	----	----	----	----	----	----	N/A		
1,1-Dichloroethane	No	7	0	0.65	0.65	0		10	N/A		
1,2-Dichloroethane	No	7	0	0.75	0.75	0		10	N/A		
1,1-Dichloroethylene	No	7	0	0.60	0.60	0		10	N/A		
cis-1,2-Dichloroethylene	No	7	0	0.75	0.75	0		10	N/A		
trans-1,2-Dichloroethylene	No	7	0	0.55	0.55	0		10	N/A		
Ethyl benzene	No	7	0	0.85	0.85	0		10	N/A		
Ethyl ether	No	7	0	0.46	0.46	0		10	N/A		
Formaldehyde[c]	N/A	0	----	----	----	----	----	— 10	N/A		
Hydrazine[d]	N/A	0	----	----	----	----	----	— 10	N/A		
Methylene chloride	No	7	0	0.65	0.65	0		10	N/A		
1,1,2,2-Tetrachloroethane	No	7	0	0.65	0.65	0		10	N/A		
Tetrachloroethylene	No	7	0	0.80	0.80	0		10	N/A		
Toluene	No	7	0	0.70	0.70	0		10	N/A		
1,1,1-Trichloroethane	No	7	0	0.55	0.55	0		10	N/A		
Trichloroethylene	No	7	0	0.60	060	0		10	N/A		
1,1,2-Trichloro-1,2,2-trifluoroethane	No	7	0	0.55	0.55	0		10	N/A		
1,2,4-Trimethylbenzene[a]	N/A	0	----	----	----	----	----	----	N/A		
1,3,5-Trimethylbenzene[a]	N/A	0	----	----	----	----	----	----	N/A		

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CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: MU-W002 **Waste Stream Lot Number:** 1

ANALYTE	Transform Data Used (No, Data-Log, SQTI, other)	# Samples	# Samples above MDL	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
m-Xylene[b]	No	7	0	1.25	1.25	0		10	N/A		
p-Xylene[b]	No	7	0	1.25	1.25	0		10	N/A		
o-Xylene	No	7	0	0.75	0.75	0		10	N/A		
Acetone	No	7	0	6.00	6.00	0		100	N/A		
Butanol	No	7	0	4.65	4.65	0		100	N/A		
Methanol	No	7	0	6.00	6.00	0		100	N/A		
Methyl ethyl ketone	No	7	0	6.50	6.50	0		100	N/A		
Methyl isobutyl ketone	No	7	0	6.00	6.00	0		100	N/A		

[a]These compounds are from the TRAMPAC and are flammable VOCs that do not appear in the QAPjP or the WIPP WAP. These are not part of the target analysis list, but samples may be analyzed for these compounds.
[b]These xylene isomers cannot be resolved by the analytical methods employed in the program. M-xylene and p-xylene will be reported as "Total m-p-Xylene."
[c]Required only for homogenous solids and soil/gravel waste from Los Alamos National Laboratory and Savannah River Site.
[d]Required only for homogenous solids and soil/gravel waste from Oak Ridge National Laboratory and Savannah River Site.

Comments:
When the "Log" transformed data is provided, it is represented in Log Ln.

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Controlled
Copy

CCP Headspace Gas Summary Data

WSP: # **MU-W002** **Lot (s) #:** 1

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	# Samples Containing TIC	% Detected
None			
			CLS 7-15-03 Page 9

CCP Headspace Gas Summary Data

WSP: # **MU-W002** **Lot (s) #:** **1**

Tentatively Identified Compound	Maximum Observed Estimated Concentrations (ppmv)	# Samples Containing TIC	% Detected

Data Confirms Acceptable Knowledge? Yes ☒ No ☐

If no, describe the basis for assigning the EPA Hazardous Waste Codes:

SPM Signature _____ Date: 7-15-03

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CCP RTR/VE Summary of Prohibited Items and AK Confirmation

WSP #: MU-W002 **Lot #:** 1

Container Number	RTR Prohibited Items[a]	Visual Examination Prohibited Items[a]	AK Confirmation[bc]
SQS121C1	None	None	Yes
SQS121C2	None	N/A	Yes
SQS121C3	None	N/A	Yes
SQS121C4	None	N/A	Yes
SQS121C5	None	N/A	Yes
SQS121C6	None	N/A	Yes
SQS121C7	None	N/A	Yes

a. See Batch Data Reports
b. Attachment 10 of CCP-TP-005, *CCP AcceptableDocumentation*
c. If AK has assigned U134 to this waste stream, then any liquids in these containers are prohibited items (not acceptable by the TSDF).

Site Project Manager Signature

Steven Rose
Printed Name

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Date

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CCP Reconciliation with Data Quality Objectives

SPQAO Sampling Completeness

RTR:
Number of valid samples: 7 Number of total samples analyzed: 7
Percent Complete: 100 (QAO is 100%)

NDA:
Number of valid samples: 7 Number of total samples analyzed: 7
Percent Complete: 100 (QAO is 100%)

HSG:
Number of valid samples: 7 Number of total samples collected: 7
Percent Complete: 100 (QAO is ≥90%)
Number of valid samples: 7Number of total samples analyzed: 7
Percent Complete: 100 (QAO is ≥90%)

Total VOC:
Number of valid samples: N/A (1) Number of total samples collected: N/A (1)
Percent Complete: N/A (1) (QAO is ≥90%)
Number of valid samples: N/A (1) Number of total samples analyzed: N/A (1)
Percent Complete: N/A (1) (QAO is ≥90%)

Total SVOC:
Number of valid samples: N/A (1) Number of total samples collected: N/A (1)
Percent Complete: N/A (1) (QAO is ≥90%)
Number of valid samples: N/A (1) Number of total samples analyzed: N/A (1)
Percent Complete: N/A (1) (QAO is ≥90%)

Total Metals:
Number of valid samples: N/A (1) Number of total samples collected: N/A (1)
Percent Complete: N/A (1) (QAO is ≥90%)
Number of valid samples: N/A (1) Number of total samples analyzed: N/A (1)
Percent Complete: N/A (1) (QAO is ≥90%)

SPQAO Signature and Date: 7/15/03

I certify that sufficient data have been collected to determine the following Program-required waste parameters:

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CCP Reconciliation with Data Quality Objectives

WSP#: MU-W002 Lot#: Lot 1

	Y/N/NA	Reconciliation Parameter
1.	Y	Waste Matrix Code.
2.	Y (2)	Waste Material Parameter Weights.
3.	Y	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.
4.	Y (3)	The TRU activity reported in the BDRs for each container demonstrates with a 95% probability that the container of waste contains TRU radioactive waste.
5.	Y (5)	Potential Flammability. Is there sufficient AK or analytical data to demonstrate that the waste meets the potential flammability limits (Headspace Gas, BDR and Summary Sheet)?
6.	Y (5)	Mean concentrations, upper 90% confidence limit (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for each **VOC** in the headspace gas of each container were calculated and compared with the program required quantitation limits, as reported in CCP-TP-003-A3, and additional EPA Hazardous Waste codes were assigned as required. Samples were randomly collected (when appropriate).
7a.	N/A (1)	Mean concentrations, UCL_{90} values for the mean concentration, standard deviations, and the number of samples collected for **total VOCs** were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003-A4, and additional EPA Hazardous Waste codes were assigned as required. Samples were randomly collected.
7b.	N/A (1)	Mean concentrations, upper 90% confidence limit (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for **total SVOCs** were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003-A5, and additional EPA Hazardous Waste Codes were assigned as required. Samples were randomly collected.
7c.	N/A (1)	Mean concentrations, upper 90% confidence limit (UCL_{90}) values for the mean concentration, standard deviations, and the number of samples collected for **total metals** were calculated and compared with the program required quantitation limits and regulatory thresholds, as reported in the Characterization Information Summary, CCP-TP-003-A6, and additional EPA Hazardous Waste codes were assigned as required. Samples were randomly collected.
8.	N (6)	The data demonstrates whether the waste stream exhibits are toxicity characteristic under 40 CFR 261, Subpart C.

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CCP Reconciliation with Data Quality Objectives

WSP#: MU-W002 Lot#: Lot 1

	Y/N/NA	Reconciliation Parameter			
9	Y (7)	Waste stream can be classified as hazardous or nonhazardous at the 90-percent confidence level.			
10.	Y (8)	Sufficient number of waste containers have been visually examined to determine the UCL_{90} for the miscertification rate is less than 14%.			
11.	Y	Appropriate packaging configuration and Drum Age Criteria (DAC) is applied and documented in the headspace gas sampling documentation, and the drum age met prior to sampling.			
12.	Y (5)	TICs were appropriately identified and reported in accordance with the requirements of Section B3-1 of the QAPjP.			
13.	Y (5)	The PRQLs for headspace gas VOCs were met for all analyses as evidenced by the analytical batch data reports.			
	Y	The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste steam or waste stream lot.			
			Completeness	**Comparability**	**Representativeness**
		Radiography	Y	Y	Y
		Headspace Gas Sampling And Analysis	N/A (4)	N/A (4)	N/A (4)
		Headspace Gas Analysis	Y	Y	Y
14.		Solids Sampling	N/A (1)	N/A (1)	N/A (1)
		Total VOCs	N/A (1)	N/A (1)	N/A (1)
		Total SVOCs	N/A (1)	N/A (1)	N/A (1)
		Total Metals	N/A (1)	N/A (1)	N/A (1)

Signature of Site Project Manager

Steven Rose
Printed Name

7-15-03
Date

(1) This is an S5000 Summary Category Group waste stream.
(2) Waste Material Parameter Weights were determined during RTR.
(3) There are drums in Lot 1 designated for Load Management/Overpacking whereby the final shipping payload container will contain TRU radioactive waste. Refer to form CCP-TP-002-A4 to identify these drums.
(4) On-Line-Sampling System.
(5) No HSG target analytes were detected and no TICs were identified.
(6) RTR and VE were unable to confirm an indication that the waste would exhibit a characteristic of toxicity. According to the AK Summary Report, cadmium (D006) and silver (D011) are present in the waste stream, but the presence of either of these heavy

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CCP Reconciliation with Data Quality Objectives

metals was not confirmed by RTR and VE. VE did identify the presence of small amounts of metals other than iron-based and aluminum metals, but the metal composition could not be determined visually.

(7) This waste stream has been determined to be hazardous waste based on the AK Summary Report indicating the presence of cadmium (D006) and silver (D011). However, the presence of either of these specific heavy metals was not confirmed visually by RTR and VE. No HSG target analytes were detected and no TICs were identified.

(8) One of the seven drums in this waste stream (MU-W002) was included with the other S5000 Summary Category Group drums at ANL-E (waste stream AECHDM), for the purpose of determining the initial miscertification rate.

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HEADSPACE GAS SUMMARY REPORT

MU-W002, Lot 1

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CCP Correlation of Container ID Numbers to Headspace Gas Sample ID Number

Headspace Gas Batch Number: See Below

WSPF Number: MU-W002 Waste Stream Lot Number: 1

Container ID Number	Headspace Gas Sample ID Number	Headspace Gas On Line Batch Number(s)
SQS121C1	03065-15	AEHSG01052003a
SQS121C2	03065-11	AEHSG01052003a
SQS121C3	03065-07	AEHSG01052003a
SQS121C4	03065-09	AEHSG01052003a
SQS121C5	03065-13	AEHSG01052003a
SQS121C6	03065-01	AEHSG01052003a
SQS121C7	03065-05	AEHSG01052003a

Use multiple copies of this attachment as necessary to document all containers discussed in this summary report. Record Waste Stream Profile Form Number and Waste Stream Lot Number on each sheet issued. Number each sheet in the space provided.

Site Project Manager (or designee):

Signature	Steven Rose	7-15-03
	Print Name	Date

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CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: MU-W002 **Waste Stream Lot Number:** 1

ANALYTE	Transform Data Used (No, Data-Log, SQTI, other)	# Samples	# Samples above MDL	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
Benzene	No	7	0	0.70	0.70	0		10	N/A		
Bromoform	No	7	0	0.50	0.50	0		10	N/A		
Carbon tetrachloride	No	7	0	0.70	0.70	0		10	N/A		
Chlorobenzene	No	7	0	0.90	0.90	0		10	N/A		
Chloroform	No	7	0	0.60	0.60	0		10	N/A		
Cyclohexane[a]	N/A	0	——	——	——	——	——	——	N/A		
1,1-Dichloroethane	No	7	0	0.65	0.65	0		10	N/A		
1,2-Dichloroethane	No	7	0	0.75	0.75	0		10	N/A		
1,1-Dichloroethylene	No	7	0	0.60	0.60	0		10	N/A		
cis-1,2-Dichloroethylene	No	7	0	0.75	0.75	0		10	N/A		
trans-1,2-Dichloroethylene	No	7	0	0.55	0.55	0		10	N/A		
Ethyl benzene	No	7	0	0.85	0.85	0		10	N/A		
Ethyl ether	No	7	0	0.46	0.46	0		10	N/A		
Formaldehyde[c]	N/A	0	——	——	——	——	——	— 10	N/A		
Hydrazine[d]	N/A	0	——	——	——	——	——	— 10	N/A		
Methylene chloride	No	7	0	0.65	0.65	0		10	N/A		
1,1,2,2-Tetrachloroethane	No	7	0	0.65	0.65	0		10	N/A		
Tetrachloroethylene	No	7	0	0.80	0.80	0		10	N/A		
Toluene	No	7	0	0.70	0.70	0		10	N/A		
1,1,1-Trichloroethane	No	7	0	0.55	0.55	0		10	N/A		
Trichloroethylene	No	7	0	0.60	060	0		10	N/A		
1,1,2-Trichloro-1,2,2-trifluoroethane	No	7	0	0.55	0.55	0		10	N/A		
1,2,4-Trimethylbenzene[a]	N/A	0	——	——	——	——	——	——	N/A		
1,3,5-Trimethylbenzene[a]	N/A	0	——	——	——	——	——	——	N/A		

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CCP Headspace Gas UCL_{90} Evaluation Form

WSPF #: MU-W002 **Waste Stream Lot Number:** 1

ANALYTE	Transform Data Used (No, Data-Log, SQTI, other)	# Samples	# Samples above MDL	Maximum (ppmv)	Mean (ppmv)	SD (ppmv)	UCL_{90} (ppmv)	PRQL (ppmv)	Transformed PRQL (N/A or Value)	UCL_{90} > PRQL Yes	EPA Code
m-Xylene[b]	No	7	0	1.25	1.25	0		10	N/A		
p-Xylene[b]	No	7	0	1.25	1.25	0		10	N/A		
o-Xylene	No	7	0	0.75	0.75	0		10	N/A		
Acetone	No	7	0	6.00	6.00	0		100	N/A		
Butanol	No	7	0	4.65	4.65	0		100	N/A		
Methanol	No	7	0	6.00	6.00	0		100	N/A		
Methyl ethyl ketone	No	7	0	6.50	6.50	0		100	N/A		
Methyl isobutyl ketone	No	7	0	6.00	6.00	0		100	N/A		

[a]These compounds are from the TRAMPAC and are flammable VOCs that do not appear in the QAPjP or the WIPP WAP. These are not part of the target analysis list, but samples may be analyzed for these compounds.
[b]These xylene isomers cannot be resolved by the analytical methods employed in the program. M-xylene and p-xylene will be reported as "Total m-p-Xylene."
[c]Required only for homogenous solids and soil/gravel waste from Los Alamos National Laboratory and Savannah River Site.
[d]Required only for homogenous solids and soil/gravel waste from Oak Ridge National Laboratory and Savannah River Site.

Comments:
When the "Log" transformed data is provided, it is represented in Log Ln.

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CCP Site Project Manager Data Evaluation Narrative

WSPF Number:MU-W002 Waste Stream Lot Number:1

WSPF Number: MU-W002, Waste Stream Lot Number 1. A statistical evaluation of 7 containers for the waste stream noted above was performed to verify AK for head space gas analytes.

The non-transformed data was compared to the non-transformed PRQL limits and none of the compounds exceeded its limit.

The container population was evaluated for normality, analyte by analyte. Two transforms were performed on each analyte data, in an attempt to 'normalize' the data sets. A log-normal transform and a square root transform were performed (the arcsine transform mentioned in SW-846, Chapter 9 is only applicable to proportion data [values of 0-1] or % data). Neither the log-normal nor the square root transform resulted in a Gaussian distribution. Due to the large number of non detects (values reported at ½ MDL) throughout the data set, there is a skewing effect which is largely responsible for this non-Gaussian distribution.

Summary descriptive data for the non-transformed and transformed data were prepared and are attached. The "W"statistic, which resulted in the highest "W" value (under the Shapiro-Wilk (SW) test for normality) was used as the metric for which the individual analytes were compared to the PRQL (either transformed or nontransformed) to verify the AK for assigning hazardous waste codes for specific analytes.

This is in strict accordance with Chapter 9 of SW-846 which states, in part, "...If either transformation is required, all subsequent statistical evaluations must be performed on the transformed scale." Thus, if the analyte had the highest "W" Statistic, in a transformed function, these transformed analyte values were compared against the transformed limits. The results of the comparison show that the data does not exceed the PRQL. The results are shown in the attached matrices.

All the transformations and comparisons are shown on the attached spreadsheets, and were performed using the Statistica controlled software package, and Excel.

All the data for the compounds were used without transformation.

All the analytes had only two observations even though there were 7 drums from which data was collected. Because of these values, the W statistic could not produce a value. The Shapiro-Wilk Test is restricted to 3<n<2000. The Shapiro-Wilk statistic effectively measures the covariance of the observations. With only two values there is no meaningful covariance. As long as there are only two values regardless of the number of observations, the transformed data will have the same calculated "W" number for the transformed or the non-transformed values. This will not occur when there are three or more values in the data set.

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